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American Federation for **Aging** Research



THE SCIENCE OF AGING GRACEFULLY

**Scientists and the Public
Talk about Aging Research**

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THE ALLIANCE FOR
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AND
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FOR AGING RESEARCH

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Scientists and the Public Talk about Aging Research

A Report Prepared by Public Agenda for:

The Alliance for Aging Research
and
The American Federation for Aging Research

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FOREWORD

Every day in America, some 6,000 adults celebrate their 65th birthday. Five years from now, that number will rise to 10,000 per day as the first wave of Baby Boomers reach that milestone. By 2029, every Baby Boomer – more than 70 million people – will be 65 and older, adding to the already strained rolls of Social Security and Medicare. The way this influential generation experiences aging will have a profound impact on America's economy and its public institutions, health care, the workplace, families and communities.

Modest health changes in this generation will make a huge difference on health outcomes and costs. For example, increased rates of obesity among middle-aged Americans could mean a reversal of the steadily declining disability rates we are now experiencing among the nation's elderly. Conversely, delaying the onset of Alzheimer's disease by five years could save an estimated \$50 billion per year, in addition to sparing patients and their families' subsequent emotional, physical and financial stress.

We believe that such an accomplishment – preventing and delaying the disabling diseases of old age – would be welcomed by the public and those who pay the bills for their health care and that new advances in aging research, such as regenerative medicine, have the greatest potential to transform the lives of aging Americans.

A better understanding of the aging process in humans may be the ultimate solution to unraveling and intervening in the mechanisms of such age-related diseases as cancer, heart disease, diabetes, Alzheimer's disease and other degenerative diseases of the brain and nervous system.

In order to assess the potential of aging-related research in America – as well as trends that might slow medical progress – our organizations, the Alliance for Aging Research and the American Federation for Aging Research, enlisted Public Agenda to poll both scientific experts and the general public in 2005. We asked the scientists about current research that could bear on human aging and health and their expectations for advances in the next decade. We asked the public about their understanding of aging research and its impact on healthy aging, as well as their expectations for living longer and healthier lives.

We believe this report, *The Science of Aging Gracefully: Scientists and the Public Talk about Aging Research*, provides an independent and balanced snapshot of the promise of research, tempered by the recognition that our fervent hopes for scientific advances could fall short. We are grateful to Public Agenda for the authoritative research and writing of this document and to the many sponsoring organizations that made this undertaking possible.

We are pleased to take part in the White House Conference on Aging. Taking place just once per decade and bearing the imprint of the federal government, the White House Conference on Aging is an opportune time to take stock of America's aging population. We hope that this report will serve to encourage advances in science that could improve the lives of millions of Americans.

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THE SCIENCE OF AGING GRACEFULLY

Scientists and the Public Talk about Aging Research

In the next three decades, the confluence of increased life expectancy and the aging of the large baby boom generation will produce an American society where one out of every five people is aged 65 or older. Research focused on age-related diseases and the fundamental processes of aging may lead to the development of new pharmacologic, surgical and lifestyle interventions that reduce the incidence of debilitating conditions and enable this large group of older Americans to live healthier and more productive lives. Interviews with 49 leading scientists found significant optimism for this research, particularly the regenerative capacity of stem cells, the potential of both “tailored” and multi-purpose pharmaceuticals in addressing age-related diseases, the power of genomics and new scientific tools to manage and analyze large bodies of biomedical data, and new areas of interdisciplinary research such as those exploring the interplay of genes and the environment. At the same time, these researchers expressed concerns about limitations that may hamper this research, including an austere funding climate for basic research in aging, ethical disquiet about stem cell research that limits government support for this work, and a variety of bureaucratic and structural impediments. A national poll of 1,000 randomly sampled adults was also conducted in order to determine their understanding and expectations for aging research and their attitudes about healthy aging.

The United States is poised on the brink of a “longevity revolution.” People are living longer, healthier lives thanks to public health advances and medical research breakthroughs. The graying of the huge baby boom generation during the coming decades will amplify this triumphant achievement, producing a society where more than one in five Americans is over the age of 65¹ and potentially more than one million are centenarians.² Though we have seen a dramatic increase in longevity and healthy aging, our healthcare system may be overwhelmed by this explosion in numbers of older adults.

By turning our attention to understanding aging and age-related diseases we can extend the healthy, active lives of older adults and limit the economic and personal burdens of an aging nation. Scientists are

increasingly looking at the underlying mechanisms of aging – how we age and why we die. We are gaining a better understanding of the science of aging and are learning how to delay the onset of age-related diseases, reducing years of costly dependence on medical and long-term care facilities and decreasing the load on an already strained healthcare system.

This research has made important contributions to the development of new drugs and clinical interventions. During the last few decades, we have developed an ever-more sophisticated understanding of the aging process, reduced the rates of cardiovascular disease, improved cancer survival rates and provided important treatments for age-related diseases including Alzheimer’s disease, Type II diabetes, osteoporosis and macular degeneration. There is also much focus on advancing stem cell research, identifying genes that modulate aging and diseases of aging and understanding the interaction between genes and our behavior and environment. Most

¹ Alliance for Aging Research. 2004 Task Force on Aging Research Funding.

² Krach, Constance; Velkoff, Victoria A. *Centenarians in the United States*. Bureau of the Census, Current Population Reports, Series P23-199RV. U.S. Government Printing Office, Washington, DC, 1999.

researchers feel that these fields will offer important breakthroughs in understanding aging.

To better understand the opportunities and challenges of extending these gains in the coming years and decades, the Alliance for Aging Research, the American Federation for Aging Research and Public Agenda conducted qualitative interviews with 49 leaders in the field of aging research. It has been almost two decades since the 1987 publication of a similar study, *Aging Research on the Threshold of Discovery*, produced by the Alliance for Aging Research. Some of its predictions included the mapping of the human genome and intervention in a host of age-related conditions by opposing genetic influences. Researchers interviewed at the time foresaw our ability to treat heart disease more aggressively and successfully with drugs and other treatments that went beyond lifestyle modifications. They also forecasted the emergence of powerful evidence that diet and exercise could slow illnesses and the “decrements of aging.” As is also often the case with these kinds of projections, some have not yet been realized, such as the uses of synthetic analogues of the natural steroid DHEA, our ability to extend healthy brain function through pharmacologic compounds or even microchips, and the discovery of cures for many age-related diseases.

This study, *The Science of Aging Gracefully: Scientists and the Public Talk about Aging Research*, finds a variety of hopeful signs for dramatic progress in our understanding of aging and the treatment of age-related illnesses. This optimism is tempered, however, by a perception of major obstacles, including an increasingly austere funding environment

for basic research, a variety of bureaucratic and structural impediments, ethical concerns related to stem cells and other moral issues and conflicting commercial interests.

Methodology

The Science of Aging Gracefully is based on 49 in-depth telephone interviews, conducted by Public Agenda in June and July 2005, with a diverse set of researchers who collectively study all major aspects of aging. A pool of 100 researchers, each a recognized leader in his or her particular field, was assembled via peer nomination, and study participants were selected at random from this list.

The research interview and focus group guides and survey questions were designed by Public Agenda in consultation with the Alliance for Aging Research and the American Federation of Aging Research. All interpretation of the data reflected in this report was conducted by Public Agenda. Questions were written to encourage participants to think broadly about the future of aging research and to explore trends from earlier studies.

This portion of the research is qualitative in nature. The findings are suggestive but cannot be generalized to all researchers who are engaged in scientific disciplines in aging-related research.

In addition to the interviews with scientists, Public Agenda conducted a focus group and a short survey of the public in order to gauge their views on aging research. This focus group allowed for an in-depth, qualitative exploration of the dynamics underlying the public’s attitudes towards complex issues. Insights

from participants in these focus groups were important to the survey design, and actual quotes were drawn from the focus groups in order to give voice to attitudes captured statistically through the survey. The focus group was moderated by Ana Maria Arumi in Fresno, California.

The public survey is based on 1,000 telephone interviews conducted with a national random sample of adults aged 18 and older. The survey was conducted between October 27 and November 3, 2005. The margin of error for the overall sample is plus or minus 3 percentage points.



SHIFTING FOCUS: FROM DISEASES TO THE AGING PROCESS

The scientists interviewed described the aging research field as being on the threshold of a new way of thinking – shifting from a focus on specific age-related illnesses to a search for an understanding of aging itself. As one gerontologist said: “We used to study the diseases of aging, but now we are understanding more about the mechanisms that regulate aging.”³ Another scientist, a biodemographer, put it even more directly: “Aging is not a disease, but a biological process,”⁴ and an endocrinologist stressed the need to distinguish “aging from pathology.”⁵

There are still many unknowns in trying to understand the aging process. According to some researchers, the most fundamental question, yet unanswered, is whether there is a specific mechanism or gene that controls aging, or if aging is instead the result of multiple basic mechanisms. Another scientist posed the question: “When a person dies a ‘natural death,’ what is the cause of death? We do not yet understand the cause of natural death.”⁶

While the scientists in our pool are still very interested in specific age-related illnesses, many feel that a better understanding of the aging process may offer cures for many of these diseases and improve the

quality of life for many older people. One scientist explained that “...it’s not about extending the time that we spend in a wheelchair.”⁷ What many of these scientists find so exciting about their research is its implications for changing the entire experience of aging. One geneticist put it this way:

Longevity is all the public hears about, but it is not about that. It is about compressing morbidity, shortening the length of time that we are affected by age-related problems such as frailty. The goal is extending the health-span, not just the lifespan. What we are talking about is keeping older people productive longer.⁸

Respondents identified at least three major factors that are driving progress in the field of aging research, and they are outlined below.

Research in Genetics

Diabetes, breast cancer, age-related macular degeneration, prostate cancer, Alzheimer’s disease and Parkinson’s disease are among the many conditions that become more prevalent with age. Some people may have a genetic make-up that provides a protection against these age-related diseases, while others may be genetically predisposed to develop them. Understanding the genetic differences between these individuals allows scientists to develop protective strategies and potential cures for the diseases. According to one scientist: “There is now a revolution taking place in

³ Valter Longo, Professor of neurobiology, University of Southern California, Leonard Davis School of Gerontology.

⁴ S. Jay Olshansky, Ph. D., Professor of epidemiology and biostatistics, University of Illinois.

⁵ William Sonntag, Ph. D., Professor of physiology and pharmacology, Wake Forest University School of Medicine.

⁶ Raj Sohal, Ph. D, Professor of biochemistry, University of Southern California.

⁷ Tom Johnson, Ph. D., Professor of Psychology/Faculty Fellow at the Institute for Behavioral Genetics, University of Colorado.

⁸ Michal S. Jazwinski, Ph. D., Professor of biochemistry and bogerontology, Louisiana State University School of Medicine.

genetics and cell biology, and we are now on the cusp of understanding basic controls over aging.”⁹ A geneticist talked about the potential of breakthroughs based on animal research that will eventually be translated to humans: “We know that animals have circuits of genes that determine how they age... This helps us understand how they stay younger longer. Mice and monkeys that have these genes can live 30% longer [than those without them].”¹⁰ Some scientists have found that by altering just a single gene, they are able to dramatically increase lifespan. Research also suggests that there may be genes that can accelerate and decelerate the aging process itself.

Development of New Technology

New technologies allow scientists to deal with large bodies of information, particularly in the area of gene sequencing. One neurologist talked about how, “technology is driving changes in research, both in the way experiments are conducted and the vast amounts of information tabulated.”¹¹ He noted: “This gives us the ability to look at multiple pathways and to look at thousands of genes at a time, which, in turn,

will further research.” The scientists also see great promise in some of the new imaging technologies. An AIDS researcher told us: “The development of imaging techniques for brain and blood vessel imaging will illustrate the interplay between cell biology and the development of cancer... improv[ing] our ability to treat some of the diseases of aging.”¹² Others saw these imaging techniques as particularly helpful in understanding Alzheimer’s disease.

Integration of Knowledge from Different Fields

One scientist stressed in his interview the importance of collaboration between geneticists and social scientists: “Gene/Environment interaction is really promising, but it’s going to require interdisciplinary research between social scientists and biomedical researchers, with the inclusion of research models that take both into account.”¹³ Many aging researchers feel breakthroughs will come from a more holistic view of the field. A biologist explained: “We now need more complex systems approaches to integrate molecular biologists, cell biologists, psychologists and computational biologists.”¹⁴

⁹ Judith Campisi, Ph. D., Senior Staff Scientist, Lawrence Berkeley National Laboratory, University of California Berkeley.

¹⁰ Cynthia Kenyon, Department of Biochemistry and Biophysics, University of California, San Francisco.

¹¹ Bruce Kristal, Ph. D., Professor of neuroscience, Weill Medical College, Cornell University.

¹² Rita Effros, Ph. D., Professor of cellular and molecular pathology, University of California, Los Angeles.

¹³ Robert Schoeni, Ph. D., Professor of population studies, public policy, and economics, University of Michigan.

¹⁴ Judith Campisi, Ph. D., Senior Staff Scientist, Lawrence Berkeley National Laboratory, University of California Berkeley.

A FUTURE OF PROMISE

Although the scientists we interviewed were hesitant and cautious in making specific predictions, we did ask them to speculate about what the field might look like five, ten and twenty years into the future. The following are areas of research where they saw potential for great progress.

Stem Cells

Many scientists mentioned stem cell research as an area with enormous promise for understanding developmental biology. Stem cells can potentially yield human cells for testing new pharmaceutical and biological interventions against specific diseases of aging. Scientists believe that the study of stem cells also offers insights into the body's own regenerative process¹⁵ and into the relationship between the aging process and cancer.¹⁶ Somatic cell nuclear transfer (SCNT) is another promising field of research that allows for the development of stem cell lines that are genetically identical to the individual patient and less likely to be rejected by the body. SCNT will also help scientists understand what causes cells to age and die and can be used to understand the mechanisms of age-related diseases.

Most of the scientists we interviewed cautioned us that stem-cell research is in its early stages and that it is a mistake to expect dramatic applications from this work to appear in the next five years. One cellular biologist noted that an increased understanding of

¹⁵ Christine Cassel, M.D., M.C.A.P., President of the American Board of Internal Medicine.

¹⁶ Peter Hornsby, Ph. D., Professor of physiology, University of Texas Health Science Center.

embryonic stem research “won't really affect anything” in that time frame.¹⁷ The scientists suggested that the application of the results of stem cell research could take as long as twenty years. However, by that time, they see the possibility of major breakthroughs in the application of stem cell technologies for humans, including the idea – often referred to in the media – of using stem cells to produce “spare parts.” One biodemographer predicted advances in regenerative medicine.¹⁸ Another scientist who specializes in biology and cancer research predicted that we might be able to “replace some aging organs, joints, damaged muscles and nerves.”¹⁹

Metabolic Functions

The scientists also cite great potential in better understanding metabolic function and eventually “manipulating the metabolism to live longer.”²⁰ One particularly promising area of research deals with the benefits of caloric restriction. Several scientists discussed new research that showed how caloric restriction could extend lifespan. One geneticist speculated that within the next five years we may come to understand “the identity of the genes that are delivering the benefits of calorie restriction in

¹⁷ Ana Maria Cuervo, M.D. Ph. D., Professor of anatomy and structural biology, Marion Besin Liver Research Center, Albert Einstein College of Medicine.

¹⁸ James Vaupel, Ph. D., Executive Director, Max Planck Institute for Demographic Research.

¹⁹ Judith Campisi, Ph. D., Senior Staff Scientist, Lawrence Berkeley National Laboratory, University of California Berkeley.

²⁰ Monica Driscoll, Ph. D., Department of Molecular Biology and Biochemistry, Nelson Biology Labs, Rutgers University.

rodents,” and he was especially hopeful that we would be able to understand the role of specific genes that allow these benefits to “extend the life of rodents.”²¹ A number of scientists saw this research as having potential long-term benefits for humans. While they did not predict this will be realized in the next five to ten years, they thought that in twenty years we might have drugs that could emulate the benefits of caloric restriction in humans.

Choices, Behaviors, Environment

Another area of research that the scientists are excited about is the potential progress in understanding how lifestyle choices and environment relate to aging. A neuroendocrinologist noted: “There is now an enormous emphasis on recognizing the obesity epidemic. There is a new momentum behind the idea of creating links between lifestyle (diet, exercise and a sense of meaning and purpose in one’s life) and age-related illness. New markers are being developed to assess how stress affects aging.”²²

Some scientists are particularly interested in the disparities in health and longevity across different demographic groups. One researcher asked: “Why do differences in education and background translate into disparities in health and longevity?”²³

The impact of diet and exercise on aging and susceptibility to age-related diseases is being stressed by researchers. They are increasingly

studying the effect of insulin levels, increased body fat, cholesterol and other changes seen with aging on the development of diseases and conditions.

There is also growing respect for controlled clinical trials of supplements – including the combination of multiple agents (e.g. the combined effects of Vitamin E, C and Q10).²⁴

Progress with Age-Related Diseases

The scientists interviewed also see opportunities for advancement in the treatment of many age-related illnesses. These scientists are particularly concerned about Alzheimer’s disease and other dementias, since these conditions are especially stressful for the patients and their families and are enormously costly to our society. According to one gerontologist: “Delaying the onset of Alzheimer’s and other dementias is critical, [because] it could really improve healthcare costs as well as attitudes about aging.”²⁵

Several of the scientists were very encouraged by the progress that has already been made in understanding Alzheimer’s disease. Great promise has been seen, for example, in understanding factors in the brain that are beneficial in the young but become toxic with age. “The therapeutic quest for the delay and treatment of Alzheimer’s,” according to one specialist, “is in full swing” and will likely have big pay-offs in the near future.²⁶ Over the longer term – ten to twenty years – they are even more hopeful.

²¹ Lenny Guarente, Ph. D., Professor of biology, Massachusetts Institute of Technology

²² Bruce McEwen, Ph. D., Professor of neuroendocrinology, Rockefeller University.

²³ Robert Shoeni, Ph. D., Professor of population studies, public policy, and economics, University of Michigan.

²⁴ Ashley Bush, M.D., Ph. D., Professor of neuroscience and genetics, Harvard Medical School.

²⁵ Christine Cassel, M.D., M.C.A.P., President of the American Board of Internal Medicine.

²⁶ Dennis Selkoe, M.D., Vincent and Stella Coates Professor of Neurological Diseases, Harvard Medical School.

Scientists are also seeing progress in cancer, diabetes, Parkinson's disease, age-related macular degeneration, cardiovascular disease and numerous other age-related diseases. Many advances have been made in earlier detection, more effective approaches to treatments and progress towards cures.

Interest in the Power of Pharmaceuticals

Pharmaceutical development has already made major strides with a new generation of small-molecule-based pharmaceuticals and biologicals, but there are indications that we are only seeing the beginning of the promise pharmaceuticals hold for advancing the treatment of age-related diseases. One geneticist

predicted that “there will be a revolution of sorts whereby many diseases can be treated with some of the drugs emerging from our current work on worms and flies, but also, we may be able to activate the body's own defenses to fight disease.”²⁷ Looking even further down the road, perhaps twenty years, the scientists see the development of “tailored medicine,” where specific drugs are developed for specific diseases and individuals. Another scientist predicted that science would not only have a better understanding of cancer and its relationship to aging, but will also have “better cancer treatments – tailor-made medications to treat the tumor and nothing else.”²⁸

²⁷ David Sinclair, Ph. D., Professor of pathology and associate member of the MIT-Harvard Broad Institute for Bioinformatics, Harvard Medical School.

²⁸ Rita Effros, Ph. D., Professor of cellular and molecular pathology, University of California, Los Angeles.

THE OBSTACLES TO RESEARCH

Although the future is promising, the research scientists we interviewed also see troubling economic, bureaucratic, ethical and commercial trends that have the potential to derail research progress. Observers of scientific research know there are always concerns about sufficient funding for research and tensions between scientific needs and the lack of public awareness. But according to these scientists, the problems in their field are more than business as usual. There are specific issues in aging research that have created a disturbing gap between the needs of the field and the usual mechanisms for supporting scientific research. If this gap widens, the promising trends that the scientists envision could be delayed. Conversely, a better fit between the needs of the field and the supporting environment could, in their view, have major benefits for society.

Lack of support for basic science

Many scientists in the field of aging research feel that focusing on an understanding of the process of aging itself – an effort to answer some of the major unanswered questions about why humans age – holds the most promise. This relatively new attitude represents a primary interest in basic science and a shift away from specific disease-related research. While this approach is deemed exciting by these scientists, and while they are convinced that it will yield enormous results, most of the available support for research is directed at individual diseases with only a tiny fraction directed at basic science. Scientists remarked: “Less than 1% of [the NIH] budget goes to understanding the biology of aging, although this is the most important area for research.

Focus is instead on the individual diseases.”²⁹ They also noted: “There is a gap, as most NIH funding is going to age-related disease research and not into basic aging research... but it is in basic research where the real breakthroughs will come.”³⁰

In effect, the dominant approach to funding scientific research is a victim of its own past successes. The respondents feel that the disease-oriented model has worked well in many respects and has generated public support, but now a different approach is needed. As one physiologist explained:

The major killers are age-related, so we are at a point where quality of life issues need to be moved to the foreground for the public. Curing diseases doesn't necessarily have an impact on quality of life. Basic aging research must be funded at the same level of research.³¹

In the view of many of the scientists interviewed, not only is the support for basic research on aging inadequate, but overall available funding is also drying up. In addition to limiting the amount of new research, scarcity of funds puts added pressure on researchers. More time is taken away from science to write grant proposals in an increasingly competitive environment. Some scientists also see evidence of a “brain drain” where laboratories and universities are

²⁹ Robert Butler, M.D., President and CEO of the International Longevity Center, USA/Professor of geriatrics at Brookdale Department of Geriatrics and Adult Development, Mount Sinai Medical Center.

³⁰ Richard Miller, M.D., Ph. D., Professor of pathology, University of Michigan.

³¹ Arlan Richardson, Ph. D., Professor of cellular and structural biology, University of Texas Health Science Center.

“losing young talented people because of the lack of funding.”³²

Lack of funding may also have implications for the role of the United States in the international science arena. The scientists we interviewed see a situation where other nations are starting to pull ahead of the United States in research. An Alzheimer’s specialist worried that “China will emerge as a big competitor in the fields of basic science... [because] complex restrictions in the U.S. discourage academia’s involvement in the development of drugs, so that there are no incentives for this kind of research in the U.S.”³³

Commercial perspectives

The researchers also see a gap between the needs of the field and the available support from pharmaceutical corporations. These scientists believe that their basic research has great potential, but commercialization of this research will take decades rather than years. This creates problems because:

No financial backers or the public want to hear that studies are going to take ten years. The expectation that things will come quickly is a misconception that needs to be understood and needs to be taken into account by all stakeholders.³⁴

Other tensions exist as well. One of the most promising directions for research is the impact of lifestyle on aging. But, as one researcher put it, “there is no incentive on the part of pharmaceutical

³² William Sonntag, Ph. D., Professor of physiology and pharmacology, Wake Forest University School of Medicine.

³³ Ashley Bush, M.D., Ph. D., Professor of neuroscience and genetics, Harvard Medical School.

³⁴ Tom Johnson, Ph. D., Professor of Psychology/Faculty Fellow at the Institute for Behavioral Genetics, University of Colorado.

companies to stress lifestyle choices rather than drugs.”³⁵

Bureaucratic obstacles to interdisciplinary research

Another obstacle to progress in aging research is the tension between the need for interdisciplinary research and growing obstacles to collaboration. As noted, the scientists believe that the major advances will involve innovative collaborations between different fields; however, there are a number of factors that stand in the way of true multidisciplinary work. Part of the problem is a lack of resources, which feeds competition rather than encourages cooperation.

Some of the researchers were critical of universities for their focus on increased specialization. One felt: “The current barriers to interdisciplinary research lie with the inability of universities to be more responsive to the need for interdisciplinary collaboration.”³⁶ Another obstacle might be the academic evaluation system:

The problem is that the culture of the field is such that you must be a recognized specialist before you can engage in multidisciplinary research. So, this effectively excludes young researchers from this sort of thing. We should change the way we evaluate younger researchers to make collaboration across fields easier and professionally sound.³⁷

³⁵ Robert Schoeni, Ph. D., Professor of population studies, public policy, and economics, University of Michigan.

³⁶ Robert Schoeni, Ph. D., Professor of population studies, public policy, and economics, University of Michigan.

³⁷ Michal S. Jazwinski, Ph. D., Professor of biochemistry and bogerontology, Louisiana State University School of Medicine.

Ideological and cultural issues

Another obstacle to research in aging comes from deeply held ideological and cultural values. For example, many scientists are very concerned about what they perceive as a threat from religious conservatives. The clearest example of this is are current restrictions on stem cell research – an area that scientists believe is particularly fruitful. On a broader level, scientists are also concerned about the growth of religious movements that are antithetical to scientific research. One researcher put it this way:

We really are lacking a much needed consensus about how to deal with different perspectives on things like stem-cell research. There are many different religions and ideological perspectives in the country, and we can't just let one dominate.³⁸

Some scientists also feel that a growing emphasis on individual rights and the rights of animals unnecessarily hamper their research. Researchers must deal with new regulations governing confidentiality of medical records, making it more difficult to deal with research on human subjects. One researcher described the Department of Health and Human Services as “schizophrenic” because of a tension between “NIH, which wants to share information as broadly as possible, and HRSA and the agencies that deal with Medicare and Medicaid, where the focus is on confidentiality.”³⁹ At the same time, an insistence on protection of animal rights

means that more time and money must be diverted from research to comply with regulations.

At the broadest level, researchers in aging are also struggling with public attitudes about age. The scientists stressed that their goal is not just to have more older people living in nursing homes absorbing public resources but rather to extend the quality of their lives. One AIDS researcher described it this way:

Ageism is a problem. The public needs to understand that there is such a thing as successful aging, where individuals can remain productive and contribute to society in old age.⁴⁰

The Best is Yet to Be

In 1864, Robert Browning penned his famous lines about aging, “Grow old along with me! The best is yet to be, the last of life, for which the first was made.” The scientists we interviewed believe that they are now in a position to make these words a reality with a vision of an extended health-span for millions of people. But this accomplishment will require a shift in thinking in a number of dimensions. We must, in the view of these scientists, find new interdisciplinary models to conduct research and different approaches to funding that research. Society will also need to find new ways to think about aging. The government will need to find new models to pay for health care, and with these new models of research, the results may very well drive dramatic changes in society.

³⁸ Christine Cassel, M.D., M.C.A.P., President of the American Board of Internal Medicine.

³⁹ Michal S. Jazwinski, Louisiana State University School of Medicine

⁴⁰ Rita Effros, Ph. D., Professor of cellular and molecular pathology, University of California, Los Angeles.

HOW DOES PUBLIC OPINION COMPARE WITH SCIENTISTS' PERCEPTIONS?

During our interviews, we asked researchers and thought leaders about their perceptions of the public's understanding of aging research issues. In an effort to either validate or refute these perceptions, our focus group and public survey included questions that paralleled the researchers' predictions. Though the findings here are intended to be suggestive rather than conclusive, our research illuminates both where researchers' perceptions of the public are accurate and where there are distinct gaps between their perceptions and the public's views on aging and aging research.

Researchers' Perception:

When the public hears about aging research, they tend to think that the goal is to extend lifespan, rather than health-span

Many thought leaders said that the public most needs to understand that aging research is not aimed at extending lifespan; rather it is aimed at extending health-span. There is a common belief among researchers that the public thinks that aging research is just about "getting people to live longer" rather than about getting people "to live healthier longer," and it is based largely on popular media coverage of aging research.

Longevity is all the public hears about, but it's not about that... [The public's told that] the old are going to live forever and eat up the resources of the young. But that's not true if what we're talking about is keeping older people productive longer.⁴¹

The Public's View:

Family is the first source of information, not media

Though sensationalized media sound bytes on aging research may focus on longevity studies, as scientists suggest, our research shows that people don't get their information solely from media outlets, nor is their perspective narrowly focused on lifespan. We found that people's first source of information about the relationship between lifespan and health-span is their families. While researchers are likely correct about the failures of media to accurately portray aging research, most people have a more nuanced understanding of health-span because of the knowledge gained watching older family members age. We were shown, through a variety of anecdotes, that families provide reservoirs of information that help individuals learn more about the impact of various lifestyle choices and opportunities.

I think back to my parents and my grandparents; their careers were always physical. They were always moving. I remember my grandmother, when she passed away at 93,...was still up and around... She kept active.
– 55-year-old, Asian female

⁴¹Michal S. Jazwinski, Louisiana State University School of Medicine

I have three of my grandparents still living, and they're in their late 80s. Again, they were active. They stayed fit. I've had older people around me all of my life, so I think I just kind of expect that... scenario out there. You stay active, you eat right, you do things, it should happen.

– 34-year-old, Caucasian male

My mother was a health food nut – she still is a health food nut – with the emphasis on the word “nut.” She also taught me how to find out information.

– 51-year-old, Caucasian male

Pretty much in growing up, my parents and my grandparents were very healthy minded, gave us vitamins religiously, even as children.

– 44-year-old, Hispanic female

You know there is this old guy, and I don't know how old he is, he's a customer... He's like in his mid-90s.... He comes in and plays chess and just kicks butt. He is so focused.... I'm looking at him thinking, “all right, my brain won't work right anymore, what is it you did differently?”

– 44-year-old, Caucasian female

Researchers' Perception:

People don't realize how much control they have over the pace at which they age

Many researchers we interviewed expressed concern that the general public may not understand how important lifestyle choices are in determining the pace of the aging process. Diet, exercise, weight control, supplements, stress management and a sense of meaning and purpose are among the top factors mentioned by biomedical researchers and thought leaders. In their view, the public either doesn't fully understand how lifestyle choices can affect aging, or they're hoping for a “magic pill” that will solve all problems.

The Public's View:

Diet and exercise are the keys to managing the aging process, but other factors, such as stress management, seem less important in determining the pace of aging

Results on public attitudes on this topic were mixed. Both the focus group and the national survey suggest that the public does understand the role of diet and exercise in the aging process. When asked about the most important lifestyle choices that contribute to leading a long and healthy life, 60% of the people interviewed mentioned a healthy diet as a crucial factor, with 31% saying that a healthy diet is the most important factor. In addition, 59% of respondents said that exercise is vitally important, while 27% said that exercise is the single most important thing a person can do to live healthy longer. As one participant in the focus group said:

You definitely have to exercise. The body, those muscles needs to be nourished with the vitamins that you ate. You have to exercise. If not then you will deteriorate. I try and keep as healthy as I can. I'm 54 years old. I work out all the time. I see a 65-year-old and he looks better than some 20-year-olds and I go, “You're my role model.” That's what keeps me going here. I can tell everybody that if you don't exercise, you die.

– 54-year-old, Hispanic male

While people appear to have a firm grasp of the role of diet and exercise in staying healthy longer, the public seems to be less aware of the other leading lifestyle factors raised by researchers. Weight control, caloric restriction and stress management are often mentioned by researchers as key factors in increasing health-span, but in terms of public perception, only 7% of the people interviewed said that stress management is one of the most important factors in

health and longevity. Only 4% said that weight control is among the most important things one can do to live a long and healthy life. While several researchers mentioned the marked health span increases that come with limiting calories, this finding does not appear to be in the public's mind. The aging-related value of limiting calories was volunteered by neither survey nor focus group respondents.

When it comes to vitamins and dietary supplements, the qualitative research we conducted suggests that there is a gap between public perception and scientists' views. While a majority of scientists we spoke with said that vitamins and supplements are a very important part of health-span, many members of the focus group expressed suspicion when discussing supplements.

[I don't take vitamins.] It's probably because, maybe it was my grandmother and my mom always telling us kids that the artificial vitamins... [are] just not the same as consuming the proper foods.
– 27-year-old, Caucasian male

However, others were quite avid about supplements.

Our food is missing micronutrients that used to be there back in your grandmother's time period of eating healthy... The only way to get that anymore is through supplements. You can't get it unless you're getting organically grown food... I think it's just we're messing with stuff we shouldn't be.
– 34-year-old, Caucasian male

Apart from these factors, there is the complex issue of the role played by a sense of meaning and purpose in the aging process. Many of the researchers we interviewed stressed that it's both the biomedical research community *and* the public at large that need to gain a better understanding of the role that a sense

of meaning and purpose can play in one's health-span.

We will continue to develop medications to treat various problems and age related diseases, but what must evolve now is attention to things like exercise and creating a sense of meaning and purpose in people's lives... Attention to these sorts of things might make medications less necessary if people can reduce stress and improve their lifestyle.⁴²

Because meaning and purpose are categories that defy measurement in traditional ways, it's a difficult topic for scientists to study. The general public, however, seems to understand from their own experiences, and from the experiences of their friends and family, the health benefits of feeling connected to others, of feeling relevant in one's family and community, of feeling that they are making a positive contribution to their world, and of feeling that they are still learning and growing.

A lot has to do with how positive you feel inside about yourself.... It affects your whole biorhythm... your self-esteem. You got to think you're all that and a bag of chips. You can never, never, let go of that idea.
– 53-year-old, Hispanic male

I want to be able to get old. Whether it's sitting and playing backgammon and interacting with people that way or whether maybe I'm teaching somebody how to run a printing press. Something, so long as I can interact and give – it doesn't have to be something concrete.
– 44-year-old, Caucasian female

⁴² Bruce McEwen, Ph. D., Department of Neuroendocrinology, Rockefeller University.

There's a lady that goes to my church and... she seems to really enjoy [things]. She'll watch the little kids, she'll watch things go on, her eyes kind of light up, so there's definitely a spark still there. There's definitely a quality of life going on. If she's at that age still able to enjoy whatever it is that life is – that's valid.

– 51-year-old, Caucasian male

Researchers' Perception:

There is a lack of understanding about the role that socioeconomic status plays in health-span

An economist we spoke with explained it this way:

Medical care explains only a small fraction of the variation in health and mortality across the population, and disparities in health and longevity across different [socioeconomic status] groups are enormous and don't necessarily have a whole lot to do with differential access to medical care. There's a lot of room for understanding social disparities and the role of social outcomes/processes in understanding health and aging.⁴³

Similarly, a neuroendocrinologist said:

Whatever we think is the "recipe for aging" we must think about what the rich can afford and what poorer people have access to. People with lower [socioeconomic status] have a greater burden and less access to the sorts of interventions – not just drugs, but also diet, exercise, things that have to do with social organization.⁴⁴

The Public's View:

Economic opportunities and the transmission of values within the family play a big role in health and aging

⁴³ Robert Schoeni, Ph. D., Department of Population Studies, Department of Public Policy, and Department of Economics, University of Michigan

⁴⁴ Bruce McEwen, Ph. D., Department of Neuroendocrinology, Rockefeller University.

While researchers emphasized that the biomedical community at large needs to get a better handle on the role of socioeconomic factors in determining the pace at which individuals age, the general public seems to already have a clear understanding of the relationship between socioeconomic status and health.

I live way below poverty level. I don't have the option, at this point, of joining a gym... I don't have the time or the money to be able to say join a gym and work out on a regular basis that way. With the physical challenges I have, the only place really for me to really work out is in a pool. That's just not an option I have right now.

– 44-year-old, Caucasian female

Going back to the income issue, if I had the money, I would do all my shopping at Whole Foods. I would buy all my food organic.

– 38-year-old, Caucasian female

Income to me provides a lot of different opportunities... whether that be making the choice to either purchase equipment, whether that means being able to go to a physician and get really accurate data about as far as what you need to do to get better. If I have the money... then I can make some choices, either I can eat or I can buy equipment to do that. I can hire a specialized trainer.

– 55-year-old, Asian female

Participants in the focus group also discussed the role of family structure and the transfer of knowledge and values.

...Mom and Dad constantly worked and provided us kids with what they could. It's just that they were never there. I mean you don't gain much from talking to your friends. They can't help you make the right [health] decisions. I just sat back and like, okay, this is it, this is me, you want to find me, I'm in the chair.

– 55-year-old, Asian woman

The example I showed [my daughter] was working all the time, but it wasn't those other things. It wasn't [that I didn't offer her physical activities] – she didn't take ballet lessons. I offered them to her, but I hadn't given her anything [as an example], I guess, to be interested in that, to want that.
– 44-year-old, Caucasian woman

Researchers' Perception:

The public needs a better understanding of the distinction between aging research and disease research.

As one biochemist put it:

The public needs to understand why we need to study aging. What is the cause of natural death? The public understands why we study diseases, but the public also needs to understand that it is important to investigate the biological causes of natural death.⁴⁵

Similarly, a neurologist believes that,

The public needs to understand the distinction between natural aging and age-related disease. Age-related researchers need to help make this distinction clear.⁴⁶

For researchers and scientists, one of the key problems with getting public support for basic aging research is the idea that most people think fatalistically about aging. Whereas the public thinks of diseases in terms of possible cures, aging may strike most people as something that is inevitable. This sense of inevitability, then, may have an impact on public perception of the relative value of basic aging research.

The Public's View:

While aging is inevitable, there is still value in basic aging research

Our qualitative research on this topic revealed some measure of ambivalence. On one hand, participants in the focus group expressed ideas that confirmed researchers' perceptions.

I think that there is not a lot of funding for research on aging because we all understand, we're born, we live, we die. I think everybody just kind of has that feeling of, "Who cares?"
– 32-year-old, Native American male

On the other hand, when given the opportunity to share perspectives and think together about the purpose of aging research and about the relationship between longevity and health-span, most participants in the focus group expressed support for basic aging research. Like researchers, participants in the focus group discussed the scientific value of broad-based research, especially once they had been presented with the idea of health-span, rather than longevity, as a vehicle for thinking through the issue.

There is goal-directed research. I mean it's all goal-directed, but some have such big agendas, you know you have to fund a cure for this specific thing. I don't think that's always necessary. However, if it was only to prolong life forever, then I guess I don't see the benefit of that in and of itself.
– 46-year-old, Hispanic male

⁴⁵ Raj Sohal, Ph. D., Department of Biochemistry, University of Southern California

⁴⁶ Dennis Selkoe, M.D., Vincent and Stella Coates Professor of Neurological Diseases, Harvard Medical School

To think of some of the things that have come out different, just like NASA, there have been lots of hot offshoots that came off the research they were doing to get us into space. There are a lot of products that came out of that, that benefit society as a whole. There's definitely a benefit to being able to do general research on the aging process. I mean because you never know what could come out of that as far as other products, or other studies that will come out of that that would provide a benefit for society.

– 37-year-old, Caucasian female

Related to support for basic aging research, participants in the focus group expressed general support for stem-cell research. This is significant, because researchers tend to think that moral and religious beliefs among the public are among the chief obstacles to advancing stem-cell research. As many public opinion studies have shown, a majority of the public supports stem cell research.⁴⁷ Our focus group findings suggest that the moral and religious obstacle to stem-cell research are more political than they are an expression of public mores. While participants expressed the need for “an organized system” that defines the limits of stem cell use, they are generally supportive of the practice.

I'm for stem cell [research], but if you start making one-hundred “Marks,” like me, then I got a problem with it. One is enough [laughing], you know? If it's to create a different organ, or something like that, to help somebody to live longer, yes, I'm for that all the way.

– 53-year-old, Hispanic male

...stem cell research is one of the things that they're looking at, but the current administration is opposed to specific avenues when it comes to that. Regardless of what your point of view is, they're limited at this point from that particular research to a specific quantity of stem cells that are available that they're allowed to do research on.

– 37-year-old, Caucasian female

Researchers' Perception:

The public tends to have unrealistic expectations about the pace of medical breakthroughs

Many thought leaders we spoke with said that the public has unrealistic expectations regarding the time frame for meaningful interventions. As one researcher put it: “There is a lack of understanding of timing and the public's expectations. Thirty years ago Nixon declared a war on cancer and we still don't have the cure.”⁴⁸ Many researchers also believe that the public expects a “magic pill” and “wants the cure [for any given disease or medial problem] sooner than is possible.”⁴⁹

The Public's View:

Medical breakthroughs can take a long time to materialize, and research needs to be supported over the long haul

This perception does not appear to be entirely accurate. Contrary to the researchers' views of public expectations, our survey showed that more than two-thirds of Americans feel that research must be supported for “as many years as it takes until cures are found.” The public seems to understand that

⁴⁷ See the “Red Flags” section of the Public Agenda issue guide on medical research. www.publicagenda.org

⁴⁸ Cynthia Kenyon, Department of Biochemistry and Biophysics, University of California, San Francisco.

⁴⁹ Ana Maria Cuervo, M.D. Ph. D., Department of Anatomy and Structural Biology, Marion Besin Liver Research Center, Albert Einstein College of Medicine.

medical research is a lengthy and complicated process, and that there's a lot that we don't know about what causes age-related diseases and the general processes of aging. When discussing the large number of unknowns that contribute to the complexity and slow-paced nature of medical research, one participant in the focus group described the process this way:

I think there are a lot of things that research has gotten to a point, and it's come to a stop. It's like having a jigsaw puzzle in a box, and getting it all put together and there's one piece missing, and you look in the box and the piece isn't there. I think maybe stem cell research is going to divine that piece that isn't there in a lot of things.
– 44-year-old, Caucasian female

Researchers' Perception:

The public is not aware of the problems involved in funding biomedical research

Many researchers expressed fears that the public doesn't understand the importance of funding aging research. In their view, getting the public "to understand that research costs money" and that the public's willingness to shoulder this responsibility is crucial "because it is a public good [that] will require public funding."

The Public's View:

The government cannot be trusted to manage resources efficiently, but public funding for research must be maintained nonetheless

While it is true that many people we spoke with are concerned with government waste and bureaucracy when it comes to funding public projects of any kind

and expressed a deep distrust of governmental structures more generally, nearly 9 in 10 people surveyed said that the level of funding for aging research should be maintained or increased. Of that group, half said that the government should increase the funding. Only 5% of those surveyed said that the level of funding should be decreased.

In a similar vein, both researchers and the public are concerned about the role of pharmaceutical companies in funding biomedical research. Some feel that the pharmaceutical industry is concerned solely with treating diseases rather than finding the root causes of why they occur and progress. In the focus group, a number of individuals weighed in on the topic, echoing some of the researcher's views:

The government was behind the polio program; today the government doesn't get behind the programs like that. They don't get behind the research like they should... the pharmaceuticals are the ones that do the aggressive research.
– 53-year-old, Hispanic male

I guess my point is... we are guided by the money source. If the money source is big drug companies then we're, by God, going to do what they want... We don't have vegetable oil cars because there's a lot of money [with petroleum interests] in Texas.
– 44-year-old, Caucasian female

The pharmaceutical companies are producing lots and lots of band-aids [to treat the symptoms of medical problems] as opposed to [addressing the] root, the core causes of diseases.
– 27-year-old, Caucasian male

Pharmaceutical companies aren't going to make any money if they cure all the illnesses.
– 44-year-old, Caucasian female

Hope for the Future of Aging Research

While the scientists' concerns are valid, our research suggests that there is some good news and cause for hope. Most generally, we found that, when given the opportunity, much of the public seems very interested and easily engaged in the topic of aging research. For example, based on our survey, two-thirds of Americans (67%) are closely following the news about medical breakthroughs in how people can live longer, healthier lives.

Our qualitative research also suggests that many of the concerns voiced by scientists are related more to politics and the media than to the public at large. For example, researchers are generally pessimistic about the future of funding for aging research, but our research suggests that actual public opinion is not opposed to their efforts. The public seems to be far more supportive of basic aging research than the official political voices might lead scientists to believe.

Likewise, when it comes to misinformation and media spectacle, the public may well be more thoughtful and sophisticated in their approach than media coverage indicates. Respondents in the focus group conducted for this study, for example, were typically quite thoughtful, and nearly all were deeply interested in becoming more informed. Their level of interest also

suggests that informal communication networks in families and communities could provide opportunities to cultivate nuanced understanding of topics like health-span and the lifestyle choices that contribute to an individual's ability to live healthier longer.

Similarly, researchers often mentioned ageism as a cause for concern and a contributing factor to the lack of support for aging research. But the individuals we spoke with and the results of the questions included in our survey hint at a very different picture. Most typical Americans seem very much concerned that older people remain relevant, cared for, loved and respected as they age. This is illustrated most clearly by the ways members of the focus group expressed concern, love and respect for the elderly people in their families and communities.

It would be naïve to suggest that ageism does not exist in this country or that our institutions – in their search for efficiency and cost-effectiveness – have not evolved policies that favor the young and ignore the old. But side-by-side with this reality, this research suggests that most people have deeply personal and close human bonds and experiences that help them understand and think about what it means to grow old. The issue is not abstract. It is in their families, their neighborhoods, and not too far down the road, they know it will be a part of their own personal lives.

Appendix

Bruce Ames, Ph. D., Department of Molecular and Cellular Biology, University of California, Berkeley.

Steven Austad, Ph. D., Department of Biological Sciences, University of Texas Health Science Center.

Andrzej Bartke, Ph. D., Department of Physiology, Southern Illinois University.

Nir Barzilai, M.D., Division of Geriatrics and Endocrinology, Albert Einstein College of Medicine.

Vilhelm Bohr, Ph. D., National Institute of Aging, Intramural Research Program (Molecular Gerontology).

Ashley Bush, M.D., Ph. D., Department of Neuroscience, Genetics, and Aging, Harvard Medical School.

Robert Butler, M.D., International Longevity Center, USA., Department of Geriatrics and Adult Development, Mount Sinai Medical Center

Judith Campisi, Ph. D., Lawrence Berkeley National Laboratory, University of California, Berkeley.

James Carey, Ph. D., Department of Entomology, University of California, Davis.

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Brian Charlesworth, Ph. D., Department of Evolutionary Genetics, University of Edinburgh, Scotland.

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Complete Survey Results

The survey portion of this study is based on 1,000 telephone interviews conducted with a national random sample of adults aged 18 and older. It was conducted between October 27 and November 3, 2005. The margin of error for the overall sample is plus or minus 3 percentage points.

Results of less than 0.5 are signified by an asterisk (*). Results of zero are signified by a dash (-). Responses may not always total 100% due to rounding. Combining answer categories may produce slight discrepancies between the numbers in these survey results and numbers in the report.

	Most Important	Total (n=1,000) %
If you want to live a long and healthy life, what's the most important thing you should do? Is there anything else? [Open-Ended]		
Healthy diet (eat well)	31	60
Exercise/Maintain physical health/Physical activities	27	59
Limit excess/Moderation (drinking, smoking, eating, etc.)	7	14
Take good care of yourself/Body (watching health)	6	9
Maintain positive outlook/Be happy	4	9
Religious reasons/Believing or trusting in God	4	7
Have good medical attention/Visit regularly/Doctors	3	7
Sleep/Rest/Be stress-free	2	7
Be involved with people (family, friends, community, society)	2	7
Watching weight	1	4
Nothing/No control	*	*
Other	2	2
Don't know	1	1
How closely do you follow news about breakthroughs in how people can live longer, healthier lives: very closely, somewhat closely, not too closely, or not closely at all?		
Very closely		20
Somewhat closely		47
Not too closely		20
Not closely at all		12
Don't know		1
Ageing research is medical research designed to better understand aging in order to extend the number of healthy, active years we live. The federal government currently provides some funding for aging research. Do you think the government should:		
Increase funding of aging research		50
Maintain the current level of funding		37
Decrease funding of aging research		5
Don't know		8
Medical studies into age-related diseases such as Alzheimer's disease and cancer can take many years to complete. Should the government commit to funding this sort of research for:		
As many years as it takes until cures are found		69
A limited time span		12
Or shouldn't the federal government do this		13
Don't know		6

Demographics

	General (n=1,000)
	%
Gender	
Male	48
Female	52
Urbanicity	
Large city	22
Suburb	23
Small town	31
Rural area	23
Don't know/Refused	1
Age	
18-24	5
25-34	11
25-44	16
45-54	19
55-64	20
65-74	13
75-84	11
85 or older	4
Refused	1
Level of education	
Less than High School	6
High School Graduate	28
Some College/Vocational	27
College Graduate	23
Post-Graduate	15
Refused/Don't know	1
Estimated Income for 2005	
Less than \$15,000	10
\$15,000 to \$29,999	14
\$30,000 to \$49,999	17
\$50,000 to \$79,999	22
\$80,000 to \$149,999	14
\$150,000 or more	6
Refused	17
Race/Ethnicity	
White/Caucasian	81
Black/African American	7
Hispanic/Spanish/Latino	5
Asian	1
Other	3
Refused	3
Region	
West	22
Midwest	24
Northeast	23
South	31

About Public Agenda

Founded in 1975 by social scientist and author Daniel Yankelovich, and former U.S. Secretary of State Cyrus Vance, Public Agenda works to help the nation's leaders better understand the public's point of view and to help average citizens better understand critical policy issues. Our in-depth research on how citizens think about policy has won praise for its credibility and fairness from elected officials from both political parties and from experts and decision makers across the political spectrum. Our citizen education materials and award-winning web site www.publicagenda.org offer unbiased information about the challenges the country faces. Recently recognized by Library Journal as one of the Web's best resources, Public Agenda Online provides comprehensive information on a wide range of policy issues.

About the Alliance for Aging Research

The private, not-for-profit Alliance for Aging Research is the nation's leading citizen advocacy organization seeking to improve the universal human experience of aging by advancing a broad spectrum of scientific and medical research and discovery. The Alliance works to raise the priority of medical and behavioral research into the aging process as a matter of national interest. From informing the nation's policymakers, to educational programs aimed at consumers on healthcare providers, the Alliance generates both knowledge and action on issues of aging and health. Additional information about the Alliance is available at www.agingresearch.org.

About the American Federation for Aging Research

The American Federation for Aging Research (AFAR) is a private, nonprofit organization whose mission is to support biomedical research on aging. It is devoted to creating the knowledge that all of us need to live healthy, productive, and independent lives. Since 1981, AFAR has awarded nearly \$87 million to more than 2,100 talented scientists as part of its broad-based series of grant programs. Its work has led to significant advances in our understanding of the aging process, age-related diseases, and healthy aging practices. AFAR communicates news of these innovations through its organizational web site www.afar.org, and educational web sites Infoaging (www.infoaging.org) and Health Compass (www.healthcompass.org).

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